Key Questions

- Which nanotechnologies show the greatest promise for preventing pollution?
- What are the most promising areas of research on pollution prevention applications of nanotechnologies?
- What recommendations do conference participants have for promoting and encouraging pollution prevention in the development and application of nanotechnology?

Setting the context - Key messages

- IMPACT TO ALL TECHNOLOGY SECTORS- AN ENABLING TECHNOLOGY
- LESS ENERGY- LESS POLLUTION – ATOM BY ATOM
- APPLY LIFE CYCLE THINKING TO THE ISSUE
- IMPROVE OUR UNDERSTANDING
- BROAD STAKEHOLDER EFFORT
- APPROPRIATE USE OF SCIENCE
- WE HAVE THE AUTHORITIES

KEY MESSAGES CONT.

- SUSTAINABLE AND TRANSPARENT
- CONTINUED INPROVEMENT
- UNCERTAIN REGULATORY FRAMEWORKS
- FACING AN INFORMED AND SKEPTICAL PUBLIC
- MEDIA COVERAGE A WILD CARD

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MANAGER'S JOURNAL

Let's Get Nanotech Right

By FRED KRUPP and CHAD HOLLIDAY
June 14, 2005; Page B2

The science of the small is raising big expectations. New materials a tenth the size of a human cell, engineered atom by atom, promise to revolutionize everything from energy production to medicine. We've seen many extravagant predictions surrounding this new world called nanotechnology: A single slender cable built from nanoparticles might carry the world's total electrical supply. Environmental burdens might be lifted by nano-pores that desalinate water or nano-cages that trap bacteria. As with new "miracle" technologies in the past, there is much speculation regarding how "nanotech" can transform the world and national economies. Governments and private investors are rushing to make major investments in projects bearing the "nano" prefix.

What is nanotechnology really? Is it a fundamentally new science or just an extension of the technologies already used to create new materials and products? Could the novel properties that make nanoparticles so promising affect human health and ecosystems in a different way than more familiar larger particles? These and other questions must be answered. The hype surrounding nanotech drowns out the need for sound, disciplined research and commercialization guided by thoughtful regulatory standards.

We've been here before. A new technology is heralded as the "next big thing." Companies are created. R&D budgets expand, and investors' eyes gleam at the prospect of new markets. Then two or 10 or 20 years later, when the technology is in widespread use, other effects become evident.

For example, before 1929, the toxic gases ammonia, methyl chloride, and sulfur dioxide were used as refrigerants, but fatal accidents occurred because of leakage. In 1928, a new family of non-toxic chemicals, chlorofluorocarbons, was invented and became the standard for refrigerants. Only decades later did we recognize that the release of CFCs was dissolving the earth's ozone layer.

Unfortunately there are many similar examples, including DDT and leaded gasoline, where we later learned of various unintended consequences of initially promising technologies.

An early and open examination of the potential risks of a new product or technology is not just good common sense -- it's good business strategy. We need to make sure this assessment takes place now for today's "next big thing" -- nanotechnology. With the right mix of voluntary corporate leadership, coordinated research, and informed regulation, we can reap the benefits of this promising technology while reducing the likelihood of unintended consequences.

Given potential liability and market risks, industry, universities, government and public interest groups should collaborate to determine what testing is necessary for new nanoproducts. Businesses should conduct the needed testing before new products enter commercial use. Products that use nanomaterials are already in our stores. Good product stewardship requires a commitment to identifying and managing any potential risks. A collaborative effort could set interim standards for nanotechnology around the world while regulations are under development.

At the same time, our government also needs to invest more seriously in the research necessary to understand fully nanoparticle behavior. Funding to study health and environmental risk represents only 4% of the proposed federal investment in nanotech and becomes vanishingly small when you factor in private investment. Government spending on nanotechnology should be reprioritized so that approximately 10% goes to this purpose. Compared to the estimated $1 trillion market for nanotechnology, this would be a wise insurance policy on such a high-potential investment.

Lastly, both public and business interests will inevitably compel regulatory protection to ensure product safety and to create a level playing field for business. Current regulations, designed for a world before nanotechnology, should be reassessed and changed as needed to account for the novel properties of nanomaterials. Business and government may need new approaches to make sure workers, consumers, the public and the environment are adequately protected.

In the end, it all comes down to this: Can we reap the benefits while minimizing the risks? We believe we can. The key steps are identifying and addressing the risks. We encourage those with an interest and a stake in nanotech to collaborate in the development of responsible safety standards and to exercise great care in the launch of new materials. We urge the federal government to adequately fund the agencies that need to understand nanotechnology so they can create thoughtful and informed regulations for this exciting field of scientific discovery and commercial promise.

Mr. Krupp is president of Environmental Defense and Mr. Holliday is chairman and CEO of DuPont.

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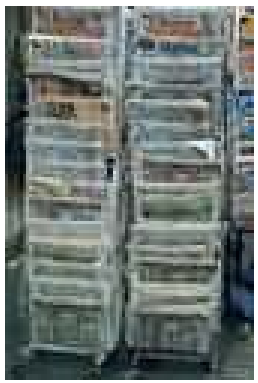
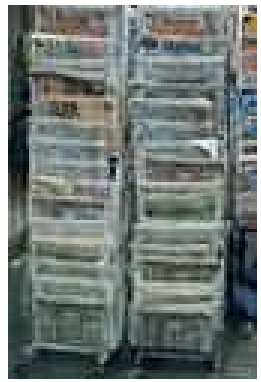
"In the Headlines"



"The guidelines are the most extensive effort yet to address a vexing issue surrounding the rapidly expanding field of nanotechnology; the lack of information about whether materials in such minute sizes can pose novel or unexpected hazards."

New York Times
June 21, 2007



KEY CHALLENGES

- $$$$$ (APPLICATION & IMPLICATIONS)
- TECHNICAL BARRIERS
- DATA AND METHOD NEEDS
- ENGAGEMENT, COLLABORTION- “KEEPING FOLKS AT THE TABLE”
- RESOLVING REGULATORY UNCERTAINTY- INTERNATIONALLY
- UNDERSTANDING THE RISK OF NOT ADOPTING NEW TECHNOLOGY